REMARKS

Claims 22 to 44 are presented for examination. Claim 22 is independent. Favorable reconsideration and further examination are respectfully requested.

In the Office Action, sole independent claim 22 was rejected over U.S. Patent No. 5,521,561 (Yrjola) in view of U.S. Patent No. 6,822,295 (Larson). We respectfully traverse the rejection.

Amended independent claim 22 is directed to circuitry for use with a mobile telephone. The circuitry comprises a terminal for use with a high-frequency signal, at least two signal lines, a switching unit for connecting the terminal to a signal line, and a primary protection device for protecting against electrostatic discharges. The primary protection device is between the terminal and the switching unit, and the primary protection device comprises a first element *that diverts <u>all voltages</u> having a pulse height greater than a 200V switching voltage to a reference potential*.

As explained on page 2 of the Office Action:

> Yrjölä does not teach a primary protection device for protecting against electrostatic discharges, the primary protection device being between the terminal and the switching unit, the primary protection device comprising a first element that diverts all voltages having a pulse height greater than a 200 V switching voltage to a reference potential.

Larson was applied to make up for the foregoing deficiency of Yrjola vis-à-vis claim 22. The Office Action states the following about Larson:

> Larson, in figure 1, and column 2 lines 6-19, teaches a device for receiving an RF signal from a terminal (112) wherein the device is prone to damage caused by surge voltages. The device is designed for use with RF signals in the microwave range from 900 MHz – 5.8 GHz (column 1 lines 36-45), which is the frequency band in which TDMA mobile phones operate. The device comprises a primary protection device (103, 104 & 106) being between a terminal (112) and a protected receiving device (111), the primary protection device comprising a first element (103, 104 & 106) that diverts all voltages having a pulse height greater than a 200 V switching voltage to a reference potential (column 6 lines 60-63).
>
> Larson teaches that when the voltage at the terminal rises above 8 volts, which is the reverse breakdown voltage (6.5 V) of the zener diode (106) plus a forward biasing voltage of the PiN diode (101), the circuit will divert the voltage to ground.
>
> It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Yrjölä with Larson, by providing the circuit protection of Larson into the device of Yrjölä for the purpose of protecting the RF equipment of Yrjölä without degrading the signal quality.[1]

We respectfully submit that, even if it were proper to combine Larson with Yrjola in the manner suggested in the Office Action[2], the resulting hypothetical combination would still fail to disclose or to suggest all of the features of claim 22. For example, the resulting hypothetical combination would fail to disclose or to suggest that a primary protection device comprises a first element that diverts all voltages having a pulse height greater than a 200V switching voltage to a reference potential.

More specifically, the Office Action relies on Fig. 1 and col. 2, lines 6 to 19 of Larson for its alleged disclosure of the foregoing features. Fig. 1 is reproduced below.

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[1] Office Action, page 3
[2] We do not concede this point.

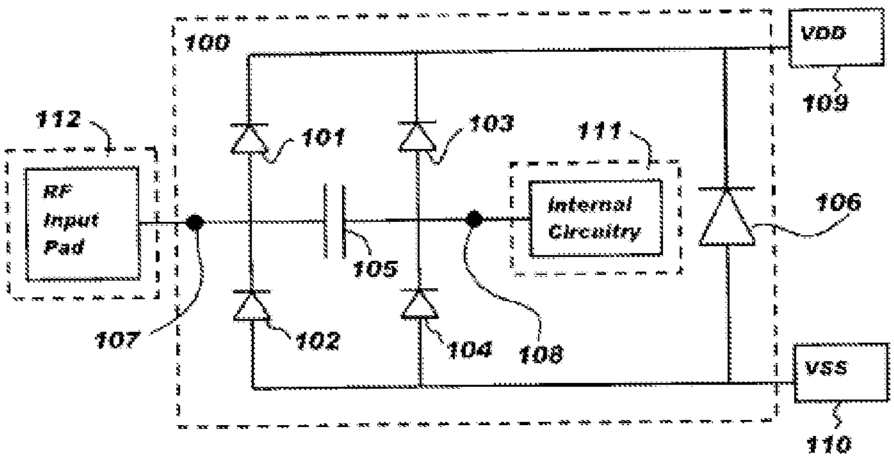

FIG. 1.

As explained in Larson, current is shunted either through PIN diodes 101, 103 or through PIN diodes 102, 104, depending on whether an over-voltage event is highly positive or highly negative. Zener diode 106 acts in response to current through PIN diodes 101, 103, which results in a highly-positive voltage at voltage source 109, to shunt current to negative voltage source 110. This is described in the following excerpts from Larson.

More specifically, the following excerpts describe the connections of the components in Larson, including the diodes.

> Referring first to FIG. 1, a preferred embodiment of the present invention an overvoltage protection device 100 is comprises a first positive voltage PiN diode 101, a second positive voltage PiN diode 103, a first negative voltage PiN diode 102, a second negative voltage PiN diode 104, a capacitor 105, a Zener diode 106, a signal node 107 and an internal circuitry node 108.[3]
>
> The first positive PiN diode 101 is electrically connected to the signal node 107 and to a positive voltage source 109…The second positive PiN diode 103 is electrically connected to the internal circuitry node 108 and to the positive voltage source 109… The first negative PiN diode 102 is electrically connected to a negative voltage source 110 and to the signal node 107… The second negative PiN diode 104 is electrically connected to the negative voltage source 110 and to the internal circuitry node 108….[4]

[3] Col. 1, lines 56 to 62
[4] Col. 3, lines 7 to 28

The following excerpt describes how Larson operates in the event of a highly positive voltage at signal node 107.

> The operation of the overvoltage protection device 100 is described next. Within a predetermined range of voltages, the PiN diodes 101, 102, 103,104 will each be in a reverse bias mode. <u>A highly positive voltage event at the signal node will cause the first positive voltage PiN diode 101 to switch from reverse bias mode to a forward bias mode resulting in most of the current flowing through the first positive voltage PiN diode 101</u>. A smaller portion of the voltage will pass through the capacitor 105 and may cause the second positive voltage <u>PiN diode 103 to switch from reverse bias mode to a forward bias mode resulting in a significant portion of the remaining current flowing through the second positive voltage PiN diode 103</u>. Depending upon the magnitude of the highly positive voltage event, the relative size of the positive PiN diodes 101, 103, the rise time of the highly positive voltage event, the amount of the highly positive voltage event that was shunted by the first positive voltage PiN diode 103 and other affecting criteria, the second positive voltage PiN diode 103 may or may not switch to a forward bias mode during a highly positive voltage event. <u>A highly positive voltage at the positive voltage source 109 created by the flow of current through the positive voltage PiN diodes 101 or 103 may cause the Zener diode 106 to "breakdown" and further shunt the positive voltage to the negative voltage source 110.</u> The Zener diode 106 will breakdown when the voltage difference across its terminals is greater than a breakdown voltage of the Zener diode 106. The breakdown voltage should be set above a normal state voltage difference between the positive voltage source 109 and the negative voltage source 110. The negative voltage source 110, acting as a ground, allows the voltage event to dissipate whereby the internal circuitry 111 is substantially protected from a highly positive overvoltage event.[5] (emphasis added)

The following excerpt describes how Larson operates in the event of a highly negative voltage at signal node 107.

> A <u>highly negative voltage event at the signal node 107 will cause the first negative voltage PiN diode 102 to switch from reverse bias mode to a forward bias mode resulting in most of the current flowing through the first negative voltage PiN diode 1</u>02. A smaller portion of the voltage will pass through the capacitor 105 and may cause the second negative voltage PiN diode 104 to switch from reverse bias mode to a forward bias mode <u>resulting in a significant portion of the remaining current flowing through the second negative voltage PiN diode 104</u>. Depending upon the magnitude of the highly negative voltage event, the relative size of the negative PiN diodes 102, 104, the rise time of the highly negative voltage event, the amount of the highly negative voltage event that was shunted by the first negative voltage PiN diode 102 and other affecting criteria, the second negative voltage PiN diode 104 may or may not switch to a forward bias mode during a highly negative voltage event. The negative voltage source 110 further allows the voltage event to dissipate whereby the internal circuitry 111 is substantially protected from a highly positive overvoltage event.[6] (emphasis added)

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[5] Col. 3, line 48 to col. 4, line 13
[6] Col. 4, lines 14 to 34

The foregoing operation is illustrated with reference to Fig. 6 (below).

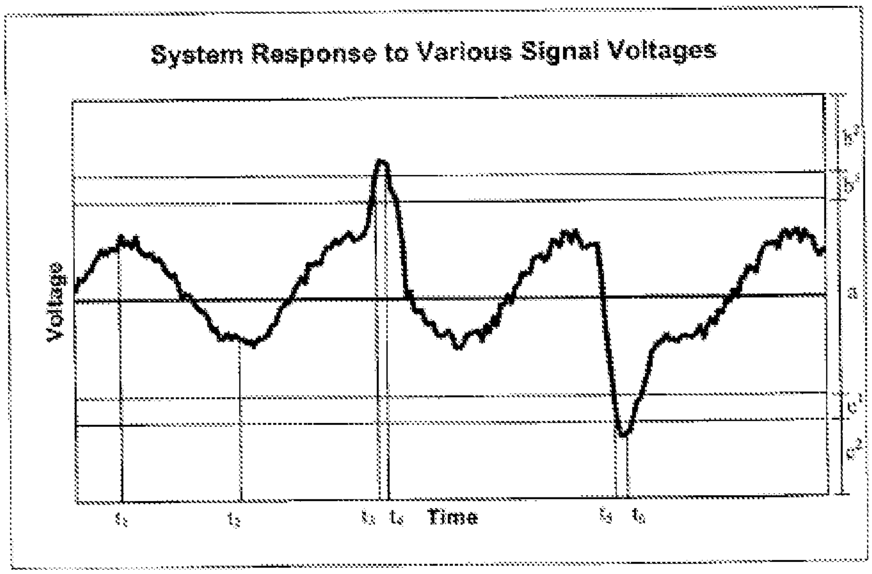

FIG. 6.

The foregoing operation of the Fig. 1 diodes is described below with reference to Fig. 6:

> FIG. 6 is a plot of signal voltage against the independent variable of time and serves as a simplified illustration of the operation of an embodiment of an overvoltage protection device. Within a predetermined range of voltage a, the PiN diodes will be in reverse bias mode. If the signal voltage moves above the predetermined range a to a first highly positive state b^1, a positive voltage PiN diode will switch to a forward bias mode. The positive voltage PiN diode will remain in forward bias mode until the voltage falls below the first highly positive state b^1. If the signal voltage rises above the first highly positive state b^1 to a second highly positive state b^2, the Zener diode will switch to a breakdown mode. Likewise, if the signal voltage falls below the predetermined range a to a first highly negative state c^1, a negative voltage PiN diode will switch to a forward bias mode. The negative voltage PiN diode will remain in forward bias mode until the signal voltage rises above the first highly negative state c^1. If the signal voltage falls below the first highly negative state c^1 to a second highly negative state c^2, the Zener diode will switch to a breakdown mode.[7]

We note that Fig. 2 of Larson shows a circuit arrangement similar to that of claim 1, but without diodes 103, 104.

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[7] Col. 5, lines 17 to 37

Thus, if Larson were combined with Yrjola in the manner suggested in the Office Action, at best the resulting hypothetical combination would result in circuitry having different elements for protecting against negative and positive high voltage levels. This is different from claim 22, which recites a primary protection device that comprises a first element that diverts *all* voltages having a pulse height greater than a 200V switching voltage to a reference potential. For at least this reason, claim 22 is believed to be patentable over the applied art.

Dependent claims are also believed to define patentable features. Each dependent claim partakes of the novelty of its corresponding independent claim and, as such, each has not been discussed specifically herein.

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

In view of the foregoing amendments and remarks, we respectfully submit that the application is in condition for allowance, and such action is respectfully requested at the Examiner's earliest convenience.

The undersigned attorney can be reached at the address shown below. All telephone calls should be directed to the undersigned at 617-521-7896.

Please apply any deficiency in fees or credits due in this case to Deposit Account 06-1050 referencing Attorney Docket No. 14219-079US1.

Respectfully submitted,

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